Claims

1. An apparatus for use in a protective relay for detecting an out-of-step condition following clearing of an external multi-phase fault, on a power line, comprising:

a circuit for detecting the presence of a multi-phase fault on the power line;

a timing circuit for readying an out-of-step logic circuit if the multi-phase external fault remains for a preselected period of time;

means for determining the positive sequence impedance on the power line; and

a circuit for declaring an out-of-step condition and for blocking selected distance elements of the protective relay if the positive sequence impedance remains inside a selected impedance plane boundary of protection for a qualified period of time following clearing of the multi-phase external fault.

2. The apparatus of claim 1, wherein the blocking of selected distance elements continues as long as the positive sequence impedance is within the selected boundary of protection.

3. The apparatus of claim 1, wherein the preselected period of time is approximately two power system cycles.

4. The apparatus of claim 1, when the qualified period of time is approximately 0.25 power cycles.

5. The apparatus of claim 1, wherein there are inner and outer boundary zones of protection defined by inner and outer impedance elements and wherein the selected boundary is the outer boundary.

6. The apparatus of claim 1, wherein if the value of positive sequence impedance remains inside the selected boundary zone of protection for more than a specific period of time, or if the rate of change of the positive sequence impedance is less than a threshold value for a certain period of time then the out-of-step blocking condition is redeclared.

7. The apparatus of claim 1, wherein the apparatus is responsive to a multi-phase fault occurring in any one of a plurality of zones of protection of the protective relay.